

LOS OSOS, CALIFORNIA: A PROPOSAL FOR
A SUSTAINABLE COMMUNITY WITHIN A SUSTAINABLE WATERSHED

Margot McDonald, AIA
Assistant Professor of Architecture
CAED & Renewable Energy Institute
Cal Poly - San Luis Obispo 93407
(805) 756-1298

Jennifer Rennick
San Luis Obispo Solar Group
8450 Tassajara Creek Road
Santa Margarita, California
(805) 438-4452

ABSTRACT

In January 1993, the American Institute of Architects and the International Union of Architects announced the "Sustainable Community Solutions" ideas competition. This paper describes principles and concepts illustrated in an award winning design competition entry based in Los Osos, California. The focus of this entry is the transformation of a suburban bedroom community on the California coast into a vital ecological city designed around its watershed. This paper outlines sustainable design strategies that encompass the full spectrum of environmental design issues at the full range of scales; global, bioregional, regional, site, building, and component as proposed by the design team.

1. INTRODUCTION

The longevity of our cities depends on social and ecological well being. In a recent book, the *Geography of Nowhere*, author James Kunstler comments on the current state of development in America: "Eighty percent of everything ever built in America has been built in the past fifty years, and most of it is depressing, brutal, ugly, unhealthy, and spiritually degrading-- the jive-plastic commuter tract home wastelands, the Potemkin village shopping plazas with their vast parking lagoons, the Lego-block hotel complexes, the 'gourmet mansardic' junk-food joints, the Orwellian office 'parks' featuring buildings sheathed in the same reflective glass as the sunglasses worn by chain-gang guards, the particle-board garden apartments rising up in every meadow and cornfield, the freeway loops around every big and little city with their clusters of discount merchandise marts, the whole destructive, wasteful, toxic, agoraphobia-inducing spectacle the politicians call 'growth'". It is as if we made a wrong turn down the development highway.

As we look for solutions in this crisis of the human and physical environments, we realize that we have overlooked practices that minimized this destruction. We realize that many of the ideas emerging as sustainable design have their origins in vernacular architecture and "good" urban design. This includes climate-responsive design, passive solar, use

of indigenous and recycled materials, water reclamation and biological waste treatment. Each of these were practiced routinely prior to current "main-stream" architectural and engineering practice.

What we seek in this proposal is not a return to a pre-industrial era; rather, a restoration of environments and patterns for living that will allow life to continue in a more enriched and renewable fashion. Achieving a balance in social, environmental and economic arenas for a community at a crossroads is the basis of our design competition entry; *Proposal: Los Osos, California: A Sustainable Community within a Sustainable Watershed*.

2. COMPETITION BACKGROUND

In January 1993, the American Institute of Architects (AIA) and the International Union of Architects (UIA) solicited a "Call for Entries" for *Sustainable Community Solutions*. In their words, the goal of the competition was:

... to propose ideas for sustainable built environments that will affect building design, architectural technologies, and community development over the next 50 to 100 years. The ideas should fit their physical and socio-economic context, they should be technically feasible, and they should improve local and global sustainability for both society and the natural environment.

The competition sought design proposals in energy and resource efficiency, healthy buildings and materials, land use and urban ecology, and comprehensive and integrated systems. A team of Cal Poly faculty and former students explored the development and application of sustainability principles to the design of whole systems for a neighboring bedroom community, Los Osos, California. The entry received one of nine first place awards in the professional category. The design solution is described here in the context of generating principles and specific design proposals in the areas of watershed and wildlife restoration, urban agriculture, resource recovery, alternative transportation, community identity, housing diversity, and economics.

3. GENERATING PRINCIPLES

In the spirit of creating a language for discussing sustainable design, we developed general principles that could be applied and tested in the context of a specific community. The principle statements that follow are intended to encourage evaluation of design solutions with sustainability as a context. The principles serve as performance criteria to compare and evaluate solutions for the implementation of *any* sustainable community design.

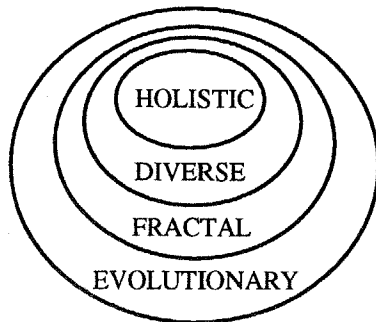


Fig. 1 Four Principles of Sustainability

3.1 Holistic

Sustainable systems are holistic because they are composed of interdependent and interconnected subsystems at multiple scales.

Rather than fragmenting a problem into smaller and smaller parts that provide isolated solutions, sustainable design seeks inclusiveness. Unlike traditional scientific method, it becomes essential to consider issues beyond the immediate scope of the project and evaluate far-reaching impacts and consequences. In architecture, this isolated treatment of design problems is also present in traditional practice. Most architects concentrate on the building envelope and interior spaces as the delimiters of their design responsibility. Many have difficulty resolving issues at other scales such as site and land use planning might pose. Similarly, for other environmental design professionals, planners rarely explore the impact of a single site on the regional environment, and landscape architects are hired for limited input on plant selection without consultation on broader site-related issues. The reasons behind this myopia are many, including pressures from clients in the contractual scope of work, to practitioners themselves who seek to limit legal liability. In addition, specialization in design education and discipline territoriality within universities also contributes to an incomplete understanding of design problems. In sustainable design, however, the challenge is to eliminate these barriers between foci and disciplines and expand the inquiry to include other scales and individuals in the decision making process.

3.2 Diverse

Sustainable systems are diverse because diversity is the generator of their resilience, vitality, and health. Decisions should enhance biological, social, cultural, and economic diversity at all scales.

Society as a whole is gradually realizing the importance of diversity in our personal and professional lives. In the social context this is expressed in terms of cultural, gender, and racial diversity. In natural sciences, biodiversity has long been understood as requisite to sustaining life species. Sustainable design seeks continuity and diversity of environments and resources.

3.3 Fractal

Sustainable systems are fractal because they are composed of internested and interacting systems whose fundamental qualities, processes, and physical forms appear self-similar at many scales.

Fractal geometry and chaos theory are emerging topics in many fields, including mathematics and physics. Just as Euclidean geometry and Cartesian coordinate systems were developed as a means of rationalizing the universe, fractals provide yet another ordering system to explain natural phenomena. Fractals, based on the repetition and recursion of geometries at different scales, yield a vocabulary for describing nature. Their patterns are detected throughout the natural environment such as the complex shape of coastlines. Because fractal and organic patterns are so integral to development of the physical environment, they should be regarded as a means of developing our own human intervened systems.

3.4 Evolutionary

Sustainable systems are evolutionary because they seek efficiency through iteration, feedback, and chaos over generations.

Evolution and change are part of the natural life and aging process. Steady state conditions are artificial and usually involve control mechanisms that ensure a particular outcome. Society and institutions need to recognize that evolution and change are necessary for healthy, living organisms and their systems. The benefits of allowing change and flexibility in our human intervening systems is that valuable information can be gained and fed back into the cycle for future iterations.

These four principles guided the design of a sustainable community-- reshaping the form and character of housing, transportation, agriculture, and economics. The specific proposal will now be discussed in the context of these generating principles.

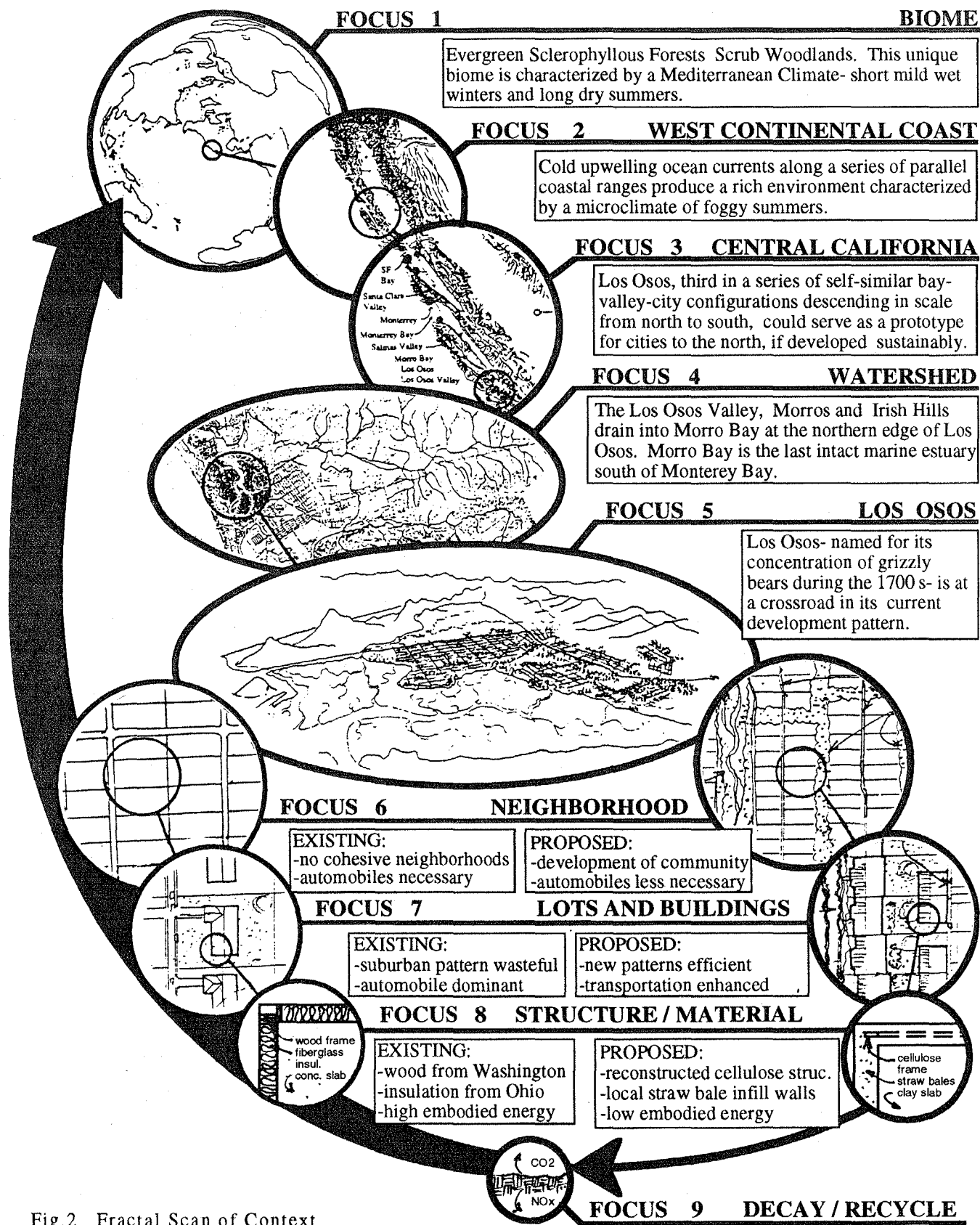


Fig.2 Fractal Scan of Context

4. THE PHYSICAL CONTEXT

The town at the center of our proposal is Los Osos, California, population 15,000. It is located on the central California coast fifteen miles from San Luis Obispo. The climate in this region is characteristically Mediterranean with mild, wet winters and long dry summers. In fact, Los Osos belongs to a biome (Evergreen Sclerophyllous Forests, Scrub Woodlands) with similar climatic and biotic conditions that repeat in only six other places on earth.

Los Osos is situated on an estuary which, together with its climate, project a unique physical and ecological setting. The adjacent Morro Bay is the last remaining intact marine sanctuary south of Monterey. The most threatened ecosystems are those of freshwater, wetlands, and Mediterranean climate areas where development pressures are increasing. The presence of wildlife and distinctive plant communities in the coastal zone must be respected and recreational, conservation, and development demands balanced. It was our desire to strengthen and build upon an understanding of place in proposing future development for the community.

5. COMMUNITY AS WATERSHED

The primary guiding principle in our design proposal was to shift away from the county government boundary description of Los Osos and towards the ecological region as defined by its watershed boundaries. To define the community by its watershed is to take into account all of the natural systems that impact life in the region and to take responsibility for resource flows into and out of the area.

In addition, we looked at the watershed as a part of the system of similar physical patterns (bays and interior valleys) on the California Coast. This movement through different scales of the study areas or different *foci* is what we have referred to as the *Fractal Scan of the Context* (Fig. 2) from the whole planet down to the smallest (molecular) scale. Our design proposal then encompasses solutions at all scales and all points of interest.

6. WILDLIFE AND WATERSHED RESTORATION

Redefining the jurisdictional boundary of Los Osos to be its watershed was a preliminary step in creating a link between physical and political concerns of the growing community. Once established, the task begins to restore physical features of the watershed so that it can serve its intended ecological purpose as well as play a role in balancing recreation, conservation, and development demands. The focus of watershed restoration involves the reintroduction of vegetation and animal life in order to balance effects of the water cycle and to provide for habitat.

Replanting native vegetation within the watershed, such as coast live oaks, will provide a foundation for restoring the water cycle. Oaks have been critical to the ecological balance in the region due to their ability to retain moisture during the wetter winter months and release it during the dry spells. This naturally occurring flywheel effect is but one example of a natural process that provides for a balance of the water process and system. The retention of water in the soil also aids in groundwater recharge, an essential characteristic need of a coastal zone without varied water supply options.

As the watershed is restored, wildlife will return to its natural habitat. The most noticeable effects of a disturbed watershed, the excessive surface runoff that is contributing to siltation of the estuary and bay, will decrease and hence the need for human intervention. The retention and replenishment of the many species that seek the estuary and tidal environment should be allowed to continue in order to promote ecotourism and aquaculture as dual aspects of the local economy.

7. URBAN AGRICULTURE

The Los Osos Valley from San Luis Obispo to the Morro Bay is prime agricultural land. As such, it has been developed in a conventional manner which includes monoculture farming with use of petrochemicals and fertilizers. Cattle raising is also a major agricultural subsidized industry in this area. Both of these practices place limits on the long-term land use, because of the effects of water pollution, soil infertility, overgrazing, and an artificial economic base.

To counter these effects, a more holistic and balanced look at resource use is needed. Diverse and indigenous crop species can be reintroduced to the area and farmed using intercropping and organic farming techniques. Monocultural farming of large, single cash crops cannot be sustained. California is already a leader in the field of economically viable organic farming on a large scale. Farmers need to take the long view in this area to secure their own future as well as the future of those who depend on their crops.

Urban agriculture also plays an important role in land use. It can be used to create open space in otherwise developed areas. Pliny Fisk, architect and innovator, writes of the "necklace" of open space surrounding the city and providing transition from urban to agricultural areas. Many cities are recognizing the intrinsic value of greenways and open space to provide visual relief and transition between community centers. Agriculture, when placed within the development and land use context, provides a functional aesthetic by making utilitarian open space.

8. COMMUNITY INFRASTRUCTURE AND RESOURCE RECOVERY

Resource recovery takes multiple forms in planning for sustainable development. From solid waste recycling, water reclamation, energy conservation and efficiency, low energy and healthy building materials, all aspects of the building cycle are impacted. Energy use takes its largest toll but also provides its greatest potential for savings through the development of a community infrastructure.

The first of these proposals is in the area of solid-waste treatment and water reclamation. Los Osos is currently being evaluated for an alternative waste-water system that is based on biological processes rather than traditional sanitary engineering practice. In California, there are at least three examples of alternative waste-treatment systems. These include the towns of Arcata, Santee, and St. Helena. The benefit of these systems, besides the low operating and maintenance costs, is the amenities they provide. In Arcata, the "sewer plant" is also a bird refuge boldly promoted by the Chamber of Commerce as a tourist destination. Santee, with its series of treatment ponds, is a place for recreational activities such as boating and fishing. St. Helena has coupled its waste treatment plant with a tourism through the construction of a winery. This is another example of a design solution that serves multiple needs and purposes. In Los Osos, the proposed constructed wetlands was seen as a means of reestablishing the city center around a recreational water feature that also had a functional purpose at its core. The ponding system would contribute to the existing aquaculture and estuary habitats.

The motivation for adopting this system is that the community is faced with groundwater pollution concerns that are especially acute given the anticipated population growth rate. A building moratorium has been in effect for the past fifteen years due to water and septic carrying capacity limits. The county engineering department has proposed a 75 million dollar conventional waste-treatment system that would add several tens of thousands of dollars to each resident's mortgage. The great capital and energy expenditure of such a plant and its piping infrastructure has caused a few knowledgeable citizens to speak out in favor of alternatives. This single issue may serve as a catalyst for sustainable development in Los Osos.

9. ALTERNATIVE TRANSPORTATION

Transportation is a major concern to Los Ososans because, as a bedroom community to San Luis Obispo, it has necessarily a commuter population.

Los Osos is linked to San Luis Obispo via a two-lane transportation corridor, Los Osos Valley Road. The fifteen mile stretch provides a relatively flat and near linear passage through agricultural fields and cattle rangeland.

The road follows the natural drainage pattern along the valley floor through prime agricultural lands. As a commuter, there is little purpose to stop at any point along the corridor, hence the high speeds. The valley provides outstanding views perhaps best appreciated by those traveling at slower speeds and not disturbed by the roar of traffic. Mass transit between the town of Los Osos and San Luis Obispo is minimal. One bus travels to and from San Luis Obispo daily. Brave bicycle commuters ride with vehicular traffic on the shoulder of the road with nearby vehicles traveling 55 miles per hour.

What makes the current situation untenable is the lack of adequate, energy conserving alternative transportation methods and routes that accommodate the range of social and environmental needs. Multiple alternatives could be easily implemented, including at least one form that is based on a locally manufactured product, a recumbent bicycle, that would allow greater flexibility to address these needs. In addition, given the unique setting of Los Osos as a popular equestrian center with links to Cal Poly as a polytechnic university, equestrian riding trails, as well as bicycle and small electric vehicle pathways could be provided. The resolution of sustainable transportation demands a full spectrum of enabling alternatives.

10. COMMUNITY IDENTITY AND DEVELOPMENT OF A CENTER

Most of the residential and commercial development in Los Osos occurred within the past fifty years and consequently is characterized by auto-oriented, strip commercial shopping centers and pockets of scattered residential development. Overall development has been haphazard and guidelines minimally dictated by the county. Moreover, as an unincorporated town, civic functions which contribute to social interaction and a physical community identity are situated away from the people they serve.

Los Osos needs a center that facilitates communication necessary for a vital community and reinforces the sense of community amongst city dwellers. This center should weave together civic functions as well as an information network. Our design proposal describes such a center. It includes a physical town hall as well as telecommunications and video conferencing capabilities. Both would decrease transportation and increase social interaction opportunities for local citizens.

In the language of sustainable development, Los Osos needs greater participation in self-governance in a holistic fashion that allows interaction with government at all scales (county, bioregional, regional, etc.) Their involvement needs to be evolutionary in that it reflects its changing public identity and its changing economic role in the region.

11. HOUSING DIVERSITY

According to its current housing patterns, Los Osos is made up of single family dwellings, small apartment complexes, and condominiums. Our proposal for Los Osos expands this limited housing resource base to include provisions for a full spectrum of housing alternatives. The need for housing diversity reflects the evolution of housing preferences and needs during different life stages that is not reflected in our building codes. This includes minimalist housing in the form of "dune dwellers" for the homeless or others seeking a bohemian lifestyle to mansion estates. Estate dwellers would make their contribution to the community as well through the provision and maintenance of open space, wildlife refuge and agriculture. There is an inherent metabolic efficiency in housing people according to their needs and choice.

On the building scale, our proposal for low-energy, healthy building materials was a combination of high and low technologies. On the low end, we propose using locally available straw-bales for infill panels in residential construction. Roof material could be the high-tech solution of transparent insulation which is known for its high insulative value and high light transmittance. Alternatively, roofing could also be a combination of transparent and opaque photovoltaics for electrical demand.

12. SUSTAINABLE ECONOMICS

Sustainable economics seeks to diversify the income base of the community by expanding local resources, although not with the absolute exclusion of the global economy. Green industries will emerge from the ecological emphasis on planning for our communities. Economic equity will play an important role as a marketplace is created for individuals at all economic levels so that they may be a vital and contributing part in a holistic economy. Applying sustainable economic principles to the local economy will build the diversified base needed to begin their evolution towards greater self-sufficiency.

The new economics also recognizes that our current methods of appraising economic health and well being are incomplete. This is especially true in the definition of "capital" and life-cycle analysis. The actual cost to a society of consumerist lifestyles, goods and services needs to include all impacts, not strictly first costs.

13. CONCLUSION

Although the proposal for a sustainable Los Osos began as a response to a "Call for Entries," it was founded on the conviction that our local community could benefit from a thorough exploration of design ideas. The visual aspect of the proposal has put specific design solutions in a form accessible to the general public for discussion and viewing.

We are moving ahead with our proposal through community forums and with alliance of county task forces. The response to developing design solutions that enhance the intrinsic natural qualities of place while respecting ecological processes and the finite resources has proven overwhelming.

14. ACKNOWLEDGMENTS

Design Competition Team: Jora Clokey, Polly Cooper, Marilyn Farmer, Jake Feldman, Ken Haggard, Henry Hammer, Brian Kesner, Margot McDonald, Mark Mondor, Dan Panetta, Jennifer Rennick, Randy Reynoso, Bill Whipple.

15. REFERENCES

- (1) Albert, Michael and Robin Hahnel. (1991) *Looking Forward: Participatory Economics for the Twenty First Century*. Boston: South End Press.
- (2) American Institute of Planners. (1978) *Community Energy Planning: Defining Achievable Alternatives. Proceedings Annual Meeting*, New Orleans, Louisiana, September 28-30, 1978.
- (3) Calthorpe, Peter. (1993) *The Next American Metropolis: Ecology, Community and the American Dream*. New York: Princeton Architectural Press.
- (4) Day, Christopher. (1990) *Places of the Soul: Architecture and Environmental Design as a Healing Art*. San Francisco: The Aquarian Press.
- (5) Fukuoka, Masanobu. (1985) *The Natural Way of Farming*. Tokyo, Japan: Japan Publications, Inc.
- (6) Haggard, Kenneth and Greg MacMillan. (1993) *Straw Bale Passive Solar Construction. Solar Today*, May-June 1993, pp. 17-20.
- (7) Gleick, James. (1987) *Chaos: Making a New Science*. New York: Viking Penguin.
- (8) Henderson, Hazel. (1988) *Politics of the Solar Age: Alternatives to Economics*. Indianapolis, Indiana: Knowledge Systems, Inc.
- (9) Hough, Michael. (1984) *City Form and Natural Process: Towards a New Urban Vernacular*. London: Croom Helm.
- (10) Hubbard, Harold. (1991) *The Real Cost of Energy. Scientific American*, April 1991, Vol. 264, No. 4, pp. 36-42.
- (11) Kunster, James Howard. (1993) *The Geography of Nowhere*. New York: Simon & Schuster.
- (12) Lappe, Frances Moore. (1982) *Diet for a Small Planet*. New York: Ballantine Books.
- (13) Mollison, Bill. (1979) *Permaculture 2: Practical Design for Town and Country in Permanent Agriculture*. Tasmania, Australia: Tagari Press.
- (14) Panetta, Dan. (1992) *Sustainability and Wastewater Treatment. Solar Today*, Sep-Oct 1992, pp. 18-20.
- (15) Tilley, Ray Don. (1991) *Blueprint for Survival. Architecture*, May 1991, pp. 64-71.